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NXP, B.V.
NXP INTELLECTUAL PROPERTY & LICENSING
M/S41-SJ
1109 MCKAY DRIVE
SAN JOSE, CA 95131

EXAMINER	
BEHM, HARRY RAYMOND	

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Please find below and/or attached an Office communication concerning this application or proceeding.

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/575,771
Filing Date: April 12, 2006
Appellant(s): SCHETTERS, CORNELIS JOHANNES ADRIANUS

Robert Crawford
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 5/18/2010 appealing from the Office action mailed 11/19/2009.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

Claims 1-2 and 7-11 are rejected.

Claims 3-5 are objected to.

Claims 6 and 12-15 are allowed.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(**5) Summary of Claimed Subject Matter**

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being

maintained by the examiner except for the grounds of rejection (if any) listed under the subheading “WITHDRAWN REJECTIONS.” New grounds of rejection (if any) are provided under the subheading “NEW GROUNDS OF REJECTION.”

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant’s brief.

(8) Evidence Relied Upon

6,813,168	Balakrishnan	11-2004
4,353,114	Saleh	10-1982
6,525,514	Balakrishnan	2-2003

TEA152x family STARplug DATA SHEET, Philips Semiconductors, 2000 Sep 08, pages 1-21.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Balakrishnan (US 6,813,168) in view of Saleh (US 4,353,114).

With respect to Claim 1, Balakrishnan discloses a power converter (Fig. 6), comprising an input circuit having a rectifier (Fig. 6 600) configured for receiving a full-wave AC signal (Fig. 6 102) along a first conductive path (Fig. 6 600-602) and a second conductive path (Fig. 6 604), the rectifier including a single diode rectifier (Fig. 4B) and a switched mode power supply IC (Fig. 6 208) arranged to receive the DC voltage output (Fig. 6 106) from a filter (Fig. 6 602-604). Balakrishnan remains silent as to the switch mode power supply being integrated and the filter comprising a non-electrolytic capacitor.

Saleh teaches a converter with an integrated circuit (Fig. 1B 10) with a π filter (Fig. 1A C41 ,C42,C45,C46 and L1) with non-electrolytic capacitors (Fig. 1A C41 ,C46) connected in series with the input and across the first (Fig. 1A X) and second conductive paths (Fig. 1A Y), that includes a conductive impedance element (Fig. 1A L1) connected in series with the non-electrolytic capacitor (Fig. 1A C41 and arranged to extend the second conductive path to common (Fig. 1A GND symbol), the filter providing a DC voltage output (Fig. 1A voltage C45). It would have been obvious to one of ordinary skill in the art at the time of the invention to power a switch mode power supply integrated circuit from a filter with non-electrolytic capacitors and a conductive impedance element after diode D1. The reason for doing integrating the circuit was “integrated circuits are now available which carry out most of the incremental signal (control) functions required therein. Such integrated circuits offer substantial cost reductions in the design of the converter” (Saleh column 1, lines 42-47). The reason for implementing a non-electrolytic capacitor in the filter was "This filter assures a relatively

steady voltage at the converter and prevents voltage ripple at the converter from being reflected back to the source" (Saleh column 3, lines 39-44).

With respect to Claim 2, Balakrishnan in view of Saleh disclose the power converter as claimed in claim 1, and remain silent as to the capacitive value of the non-electrolytic capacitor. It would have been obvious to one of ordinary skill in the art at the time of the invention to implement the capacitance of the non-electrolytic capacitor as about 100nF. The reason for doing so was 100nF was a well known and common value for a non-electrolytic capacitor and one of ordinary skill in the art would have been able to select a capacitance of a filtering capacitor.

See MPEP 2144.05 II. OPTIMIZATION OF RANGE

A. Optimization Within Prior Art Conditions or Through Routine Experimentation

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Balakrishnan (US 6,813,168) in view of Saleh (US 4,353,114) and further in view of Balakrishnan (US 6,525,514) .

With respect to Claim 7, Balakrishnan in view of Saleh disclose the power converter as claimed in claim 1, wherein the DC voltage output of the filter is applied to a series connection of a primary winding (Saleh Fig. 1B I), the switched mode power supply IC power transistor (Fig. 1B Q42), and a resistor (Fig. 1 R59). Balakrishnan ('168) in view of Saleh do not require the power transistor be integrated into the switch mode power supply integrated circuit.

Balakrishnan (‘514) teaches a switch mode power supply integrated circuit (Fig. 1 139) in which the power transistor is integrated into the integrated circuit. It would have been obvious to one of ordinary skill in the art at the time of the invention to integrate the power transistor into the switch mode power supply integrated circuit. The reason for doing so was to reduce the size and cost as was well known at the time of the invention.

Claims 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Balakrishnan (US 6,813,168) in view of Saleh (US 4,353,114) and further in view of the TEA152x family data sheet by Philips.

With respect to Claim 8, Balakrishnan in view Saleh disclose a power converter as set forth above and do not disclose the gain of the feedback loop. It would have been obvious to one of ordinary skill in the art at the time of the invention to power the Philips IC TEA1520P with the half wave rectifier and pi filter. The reason for doing so was the TEA1520P "is a Switched Mode Power Supply (SMPS) controller IC that operates directly from the rectified universal mains. It is implemented in the high voltage EZ-HV SOI process, combined with a low voltage BICMOS process. The device includes a high voltage power switch and a circuit for start-up directly from the rectified mains voltage" (TEA 152x family data sheet page 2).

With respect to Claim 9, Balakrishnan in view Saleh and the TEA152x Datasheet disclose a power converter as set forth above wherein the high gain feedback loop

includes a multiplier arranged to diminish ripple caused by the non- electrolytic capacitor.

With respect to Claim 10, Balakrishnan in view of Saleh and the TEA152x Datasheet disclose a power converter as set forth above wherein the multiplier is a factor 10 multiplier.

With respect to Claim 11, Balakrishnan in view of Saleh and the TEA152x Datasheet sheet disclose a power converter as set forth above, wherein the switched mode power supply IC (Fig. 2 20) includes an internal start-up circuit having a high-voltage start-up current source and without provision of any dissipative bleeder resistor [inrush resistor external to IC].

(10) Response to Argument

I. Appellant argues the references do not suggest the pi filter of the secondary reference Saleh is desirable in the primary reference of Balakrishnan. This is incorrect since Balakrishnan teaches the desirability of a pi filter in Figure 1 and the additional embodiments are also pi filters where the values of the input capacitance and inductance are varied. Furthermore Saleh discloses an enhanced pi filter which one of ordinary skill in the art would have recognized as beneficial for providing improved filtering.

II. Appellant argues the two references are directed toward different applications and the elements in combination do not perform the function that each element performs separately.

Firstly, the references are not directed toward different application since Saleh discloses the input (supply) voltage can be unregulated (Saleh column 1, lines 30-33). Clearly Saleh envisions an AC component present on the input which needs to be filtered. Secondly, Appellant's assertion that the Balakrishnan reference is directed toward an AC source is also wrong since the output of the rectifier has by definition a direct current (DC). Since the rectifier blocks the negative voltage, only positive voltage is applied from the output of the rectifier to the filter, and the resulting current is uni-directional, *i.e.* direct current (DC) only.

Appellant's assertion that the combination does not perform the function that each element performs separately is likewise flawed. Fundamentally a pi filter acts to filter frequency components regardless of the degree to which the input is AC or DC. The functionality of the filter is not changed by the input to the filter, since the filter still acts to filter frequency components. Furthermore, Saleh discloses an enhanced filter with improved filtering capability. If there were more AC ripple in the implementation of the primary reference, the need for filtering would be increased. Therefore the improved filter of Saleh would be more appropriate under conditions where more AC ripple was present and would provide more beneficial filtering of the AC components.

Appellant argues Saleh discloses a zener diode to lower the DC level to that determined by the DC level. On the contrary, the DC output voltage is not set by the

zener voltage level. Saleh clearly states "Surges in the input voltage are clipped by a zener diode CR52" (Saleh column 3, lines 45-46). The zener diode of Saleh is used as a voltage clamp and provides additional over-voltage protection. The pi filter of Saleh does not rely on or require the zener diode. One skilled in the art would have understood the tradeoffs of the benefits from adding over-voltage protection such as zeners or MOV's versus the cost of implementing additional components. Finally, nothing in the claim language prohibits implementing additional over-voltage protection and the rejections are appropriate whether additional over-voltage protection were implemented or not implemented.

Appellant argues the filter of Saleh appears to be shown with a saturable reactor. In fact the filter illustrated in Figure 1A of Saleh shows an inductance L1 consisting of two mutually coupled inductors with a laminated core. L1 does not depict a saturable reactor. Even if L1 depicted a saturable reactor, the degree to which L1 would be saturable would not alter patentability, since the selection of magnetics was well known and predictable. One of ordinary skill would understand how to select the inductance of the pi filter based upon the filtering requirements of the application. Balakrishnan explicitly teaches as much in the embodiment of Figure 6 where an additional inductor is shown to enhance the filtering characteristics of the pi filter "For instance, in one embodiment, one of the inductor 602 or 604 could be designed specifically to have different impedance versus frequency characteristics in order to filter specific EMI frequencies more efficiently" (Balakrishnan column 6, lines 18-20). Appellant has not provided any evidence against the combination and appears to be merely identifying

differences between the references and arguing the unsupported conclusion that the combination does not perform the function that each element performs separately. As already stated above, the '168 reference is not directed to an AC source since the input to the filter is rectified and the enhanced inductive capabilities of the Saleh filter would provide additional flexibility and filtering capability.

III. Appellant argues there is no indication in the references the filter would result in the benefit of assuring a stable, filtered output.

Such a conclusion is clearly in error since Balakrishnan explicitly teaches the well known pi filter was capable of satisfying the filtering requirements of a half wave rectifier. In the detailed description of Figure 1, Balakrishnan discloses the rectifier circuit can be a well known “half wave rectifier circuit” (Balakrishnan column 1, lines 40-42) “using a single diode” (Balakrishnan column 1, lines 46-47). Figure 1 clearly shows the pi filter 103-105 is capable of satisfying the filtering needs of the circuit. Examiner has shown the half-wave rectifier in circuit 100 in Figure A below. The additional figures of Balakrishnan teach a pi filter with less capacitance than the pi filter taught by Saleh. Figures 2-6 of Balakrishnan clearly teach the viability of using less capacitance in the pi filter since the input capacitor is entirely removed and only the AC input capacitance is relied upon. Therefore Balakrishnan teaches the pi filter will provide the benefit of assuring a stable, filtered output and the capacitance should be varied depending on the needs of the application. Finally, it would have been obvious to one of ordinary skill in the art at the time of the invention to adjust the pi filter components based upon the

level of filtering required and it also would have been obvious at the time of the invention to add more inductance, such as L1 of Saleh, to the pi filter of Balakrishnan to provide additional filtering capability when required.

IV. Appellant argues improper hindsight was used by the Examiner to introduce a non-electrolytic capacitor into the filter of Balakrishnan despite the fact that the Saleh reference discloses the use of non-electrolytic capacitors in pi filters long before the time of Appellant's application. In response to Appellant's argument that the conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Non-electrolytic capacitors C41 and C46 of Saleh demonstrate the use of non-electrolytic capacitors in pi filters were known at the time of the invention and within the level of ordinary skill at the time of the invention. Selections of capacitors or capacitance values in filters were routinely made at the time of the invention and well within the skill of one of ordinary skill at the time of the invention. Furthermore, the selection of capacitors or capacitance values in filters provides consistent and predictable results. Finally, Examiner notes Appellant's rejected claims are so broad as to read upon many possible combinations of the references. Three combinations are presented below.

A. The pi filter of Saleh (Fig. 1A C41,C42,L1,C45,C46) could be bodily incorporated into the reference of Balakrishnan to replace the pi filter of Balakrishnan (Figure 1 103-105, Figure 6 602-604). This straightforward substitution in order to provide enhanced filtering capability can not reasonably be interpreted as improper hindsight.

B. It was well known at the time of the invention to use capacitors of different types (electrolytic with non-electrolytic) in parallel since the non-electrolytic capacitor was known to have a much lower equivalent series resistance (ESR). Although the non-electrolytic capacitor was not used to significantly increase the overall capacitance when in parallel with a larger electrolytic capacitor having a greater capacitance, the much lower ESR of the non-electrolytic capacitor was known to provide superior filtering of higher frequency components. Saleh discloses a non-electrolytic capacitor in parallel with an electrolytic capacitor in a pi filter and it would have been obvious of one or ordinary skill in the art to implement a non-electrolytic capacitor in parallel with the electrolytic capacitor 603 of Balakrishnan in order to filter high frequency components due to the low ESR of the non-electrolytic capacitor. Examiner has shown a non-electrolytic capacitor C46 implemented in parallel to the electrolytic capacitor in Figure B below.

C. Balakrishnan teaches adjusting the capacitance of the pi filter from a large input capacitance implemented with a large bulk capacitor shown in Fig. 1 103 to a small capacitance implemented without a capacitor and instead relying on the capacitance in the AC line as depicted in Figure 6 201. It would have been obvious to

one of ordinary skill in the art at the time of the invention to implement a desired capacitance, that is a capacitance value between the large bulk capacitance of the electrolytic capacitor and the low AC line input capacitance, with a non-electrolytic capacitor. As already stated above, the use of non-electrolytic capacitors in pi filters were known at the time of the invention. It would have been obvious to one of ordinary skill in the art at the time of the invention to implement a non-electrolytic capacitor when more filtering was required than could be provided by the AC line capacitance or when the AC line had a lower inherent capacitance, but a large, bulk electrolytic capacitance was not required. Examiner has depicted such an implementation in Figure C below.

Appellant argues there is no teaching that a non-electrolytic capacitor was adequate for filtering a half wave rectified input. On the contrary, Balakrishnan teaches an embodiment in which the bulk capacitor on the input side (capacitor 103) is entirely removed and only the capacitance of the AC source is available. Clearly adding additional capacitance from a non-electrolytic capacitor would provide adequate filtering as shown in Figure C below.

Appellant argues there in no teaching that a non-electrolytic capacitor was adequate for filtering without additional over-voltage components. This argument is in error for the reasons stated above, namely that Balakrishnan teaches an embodiment in which the bulk capacitor on the input side (capacitor 103) is unnecessary and only the capacitance of the AC source provides sufficient capacitance without additional capacitor or over-voltage components. Furthermore, nothing in Appellant's claim

language prohibits implementing additional over-voltage protection if desired. Even if additional over-voltage protection was added, such as zeners or MOVs, the combination would satisfy all claim limitations.

V. Appellant argues Balakrishnan teaches away from using the pi filter of Saleh. Categorization of the Balakrishnan reference as teaching away from the combination is incorrect. The Balakrishnan reference teaches use of a range of input capacitances and inductances and further teaches the use of optimized inductances such as the inductance L1 of Saleh. As previously stated above Balakrishnan teaches using a range of capacitances between a small capacitance value of the AC line capacitance (Fig. 6 201) to a large value of capacitance with an electrolytic capacitor (Fig. 1 103) as required by the application. Likewise Balakrishnan teaches using customized inductances for the application as required - “one of the inductor 602 or 604 could be designed specifically to have different impedance versus frequency characteristics in order to filter specific EMI frequencies more efficiently” (Balakrishnan column 6, lines 18-20). Instead of teaching away from the combination, the Balakrishnan reference teaches modifying the pi filter as required by the application, which is fully consistent with the teaching of Saleh.

Appellant further argues the primary reference Balakrishnan teaches away from an input capacitor in the pi filter due to the cost and cites Balakrishnan column 4, lines 5-7. However, Appellant has just selected one of the many embodiments and not fairly categorized the teaching of the reference. Appellant refers to the description of Figure 2,

which is not the figure used in the rejection, and the teaching of the desirability to remove components when possible. Unquestionably one of ordinary skill would understand the desirability of removing components. While it is desirable to remove any component since the removed component can not fail and has no cost, the functionality of the removed component is also lost. One of ordinary skill would recognize some components are required by the demands of an application and can not be removed. For instance one of ordinary skill would recognize the desirability of removing all EMI filtering components since the removal of all components would have the least cost and size, nevertheless in most applications this is not possible. The tradeoffs between the size and cost of adding EMI filtering components versus the benefits gained of having additional EMI filtering and protection were well understood and predictable. It was well known that EMI filtering requirements vary with the application depending on the noise and capacitance present on the input AC source as well as on the noise generated by the switched mode power supply (SMPS) due to the requirements of the load current and regulation, switching frequency and susceptibility of equipment on the AC line and one or ordinary skill would have understand to select an appropriate level of filtering to satisfy the EMI filtering requirements.

Balakrishnan also teaches components may have to be added depending on the application and depicts alternative embodiments to satisfy the filtering requirements. For instance the embodiment depicted in Figure 1 teaches using an additional bulk capacitor over that of Figure 2, while the embodiment of Figure 6 utilizes an additional inductor over that of Figure 1. The embodiment of Figure 6 expressly teaches adding a

second inductor, which increases the cost and size, contrary to Appellant's argument that the teaching is only to reduce components. One of ordinary skill would understand to achieve better filtering requires a more complicated filter with additional components. The tradeoffs between the noise present on the AC line, the noise generated by the SMPS and the filtering required were well understood by electrical engineers at the time of the invention. Examiner points out the skill level in electrical and power engineering was high at the time of the invention and it would have been obvious to one of ordinary skill to select the appropriate level of filtering, which varies from application to application depending on the load requirements as already stated above. It would have been obvious to one of ordinary skill in the art at the time of the invention to implement additional capacitors or inductors as needed in a pi filter for applications with higher noise generation or susceptibility, even if one or two additional small non-electrolytic capacitors needed to be added.

VI. Appellant argues the references do not disclose a workable solution and largely repeats the arguments previously stated. On the contrary to providing no workable solution, the main reference Balakrishnan teaches using a range of capacitances from a large input bulk electrolytic capacitor to no capacitor, relying instead only on the AC input capacitance. One of ordinary skill would have understood the obviousness of implementing a small non-electrolytic capacitor for providing the appropriate capacitance when the AC input capacitance is inadequate, but a large bulk capacitance is not needed. It would have been obvious to one of ordinary skill in the art at the time of the invention to select a capacitor appropriate to the noise level.

Furthermore the modification of the pi filter of Balakrishnan based upon the disclosure of the pi filter of Saleh would have a very high probability of succeeding, much better than the reasonable chance of success required for maintaining the rejection.

Appellant reiterates the circuit of Saleh is not designed for AC rectification. However, the circuit is designed for DC filtering and rectification, such as that provided after the rectifier of Balakrishnan as already stated above. Furthermore, Balakrishnan teaches the pi filter is capable of rectification and filtering.

Appellant reiterates Saleh discloses a zener diode. Examiner maintains the combination could be made with or without implementing additional over-voltage protection such as zener diodes as already stated above.

Appellant comments on properties of a saturable reactor not relevant to patentability. Clearly no control winding is shown for the inductance L1 depicted in Figure 1A of Saleh. Furthermore, the selection of magnetics and inductances for use in filtering EMI was well known, straightforward, and predictable at the time of the invention as already stated above.

Appellant argues the proposed combination is unclear. Examiner maintains the broad claim language of the rejected claims would read upon multiple possible combinations, two of which are depicted in Figures B and C below. Furthermore, the entire pi filter of Saleh (Fig. 1A C41,C42,L1,C45,C46) could be implemented in place of the pi filters illustrated by Balakrishnan for the reason of providing additional filtering as already stated above.

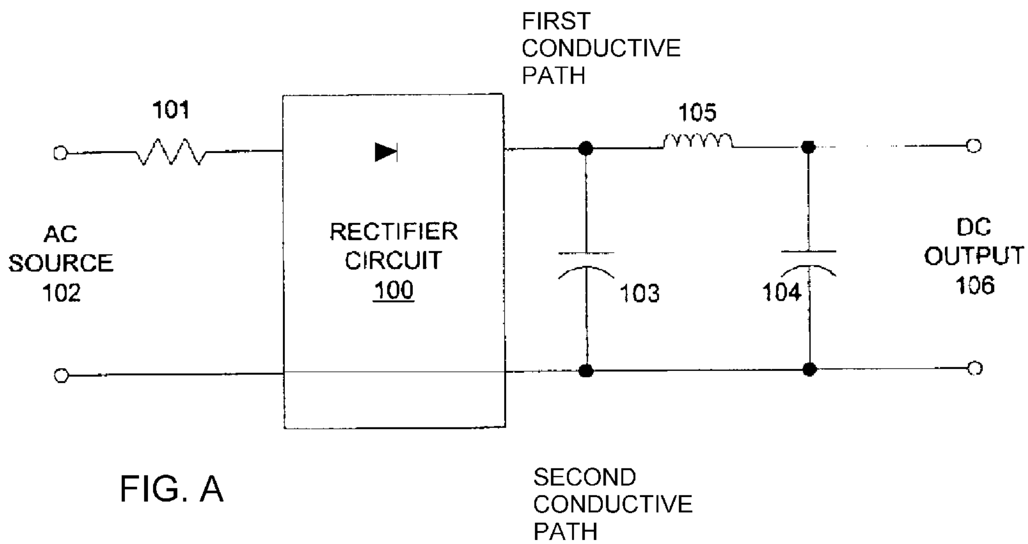
FIRST
CONDUCTIVE
PATH
101
105
AC
SOURCE
102
RECTIFIER
CIRCUIT
100
103
104
DC
OUTPUT
106
SECOND
CONDUCTIVE
PATH

FIG. A

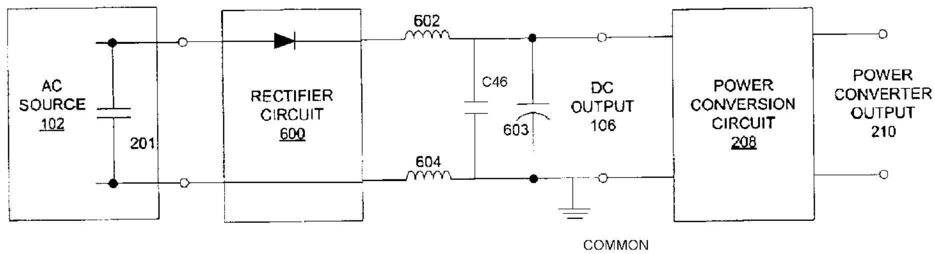
AC
SOURCE
102
201
RECTIFIER
CIRCUIT
600
602
604
C46
603
DC
OUTPUT
106
COMMON
POWER
CONVERSION
CIRCUIT
208
POWER
CONVERTER
OUTPUT
210

Fig. B

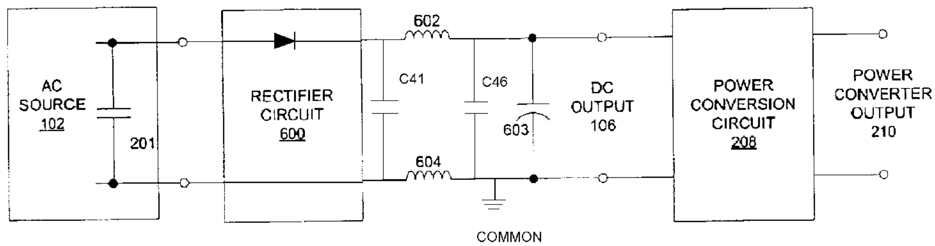

Fig. C

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Harry Behm/

Primary Examiner, Art Unit 2838

Conferees:

/Monica Lewis/

Supervisory Patent Examiner, Art Unit 2838

/Brian Sircus/
Brian Sircus, TQAS, TC 2800